

HIGH PURITY COBALT SPUTTER TARGET AND PROCESS OF MANUFACTURING THE SAME

ABSTRACT

A high purity cobalt sputter target is disclosed which contains a face centered cubic (*fcc*) phase and a hexagonal close packed (*hcp*) phase, wherein the value of the ratio of X-ray diffraction peak intensity, $I_{fcc}(200)/I_{hcp}(10\bar{1}1)$, is smaller than the value of the same ratio in a high purity cobalt material obtained by cooling *fcc* cobalt to room temperature from the high temperature at which it is molten.

High purity cobalt is defined as having an oxygen content of not more than 500 ppm, a Ni content not more than 200 ppm, an Fe, Al and Cr contents not more than 50 ppm each, and Na and K less than 0.5 ppm. The disclosed sputter target is manufactured by subjecting the material to cold-working treatments (less than 422 °C). Annealing the material, at a temperature in the range 300 - 422 °C for several hours, between cold working treatments significantly increases the amount of cold work which could be imparted into the material. The high purity cobalt is deformed in such a way so as to cause the (0002) *hcp* plane to be tilted between 10-35° from the target normal. The aforementioned phase proportions and crystallographic texture significantly improves the sputtering efficiency and material utilization.